

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) An antibody fragment comprising a Fab or Fab' fragment to which that has been modified by attachment of at least one effector molecule is attached characterized in that wherein the heavy chain in the fragment is not covalently bonded to the light chain, and both the interchain cysteine of C_L and the interchain cysteine of C_{H1} have been replaced with another amino acid.
2. (original) The antibody fragment of claim 1 wherein the interchain cysteine of C_L and the interchain cysteine of C_{H1} have been replaced with a non-thiol containing amino acid.
3. (original) The antibody fragment of claim 2 wherein the interchain cysteine of C_L has been replaced with serine.
4. (original) The antibody fragment of claim 2 wherein the interchain cysteine of C_{H1} has been replaced with serine.
5. (original) The antibody fragment of claim 2 wherein both the interchain cysteine of C_{H1} and the interchain cysteine of C_L have been replaced with serine.
6. (currently amended) The antibody fragment of ~~claims 1-5~~ claim 1 wherein the interchain cysteine of C_L is at position 214 of the light chain and the interchain cysteine of C_{H1} is at position 233 of the heavy chain.
7. (currently amended) The antibody fragment of ~~claims 1-6~~ claim 1 where wherein at least one effector molecule is attached to the heavy or light chain constant region of the fragment.
8. (currently amended) The antibody fragment of ~~claims 1-7~~ claim 1, wherein an effector molecule is attached to a cysteine in the light chain constant region and to a cysteine in the heavy chain constant region of the fragment.

9. (original) The antibody fragment of claim 8, wherein the cysteine residues in the heavy and light chain constant regions which are attached to effector molecules would otherwise be linked to each other via a disulphide bond if the effector molecules were not attached.
10. (currently amended) ~~An~~ The antibody Fab' fragment according to claims 1-9 of claim 1 wherein the fragment is a Fab' fragment that contains a modified hinge region.
11. (currently amended) ~~An antibody Fab'~~ fragment according to claim 10 in which The antibody fragment of claim 10 wherein the modified hinge region contains 1 cysteine residue.
12. (currently amended) ~~An antibody Fab'~~ fragment according to claim 11 in which The antibody fragment of claim 11 wherein the modified hinge region comprises the sequence in of SEQ ID NO:1 or SEQ ID NO:2.
13. (currently amended) ~~The antibody fragment of claim 10 in which~~ The antibody fragment of claim 10 wherein the modified hinge region contains 2 cysteine residues.
14. (currently amended) ~~An antibody Fab'~~ fragment according to claim 13 in which The antibody fragment of claim 10 wherein the modified hinge region comprises the sequence in of SEQ ID NO:3 or SEQ ID NO:4.
15. (currently amended) ~~An~~ The antibody Fab' fragment according to claims 1-14 where of claim 1 wherein the fragment is a Fab' fragment in which at least one effector molecule is attached to the hinge region of the fragment.
16. (currently amended) ~~An antibody Fab'~~ fragment according to The antibody fragment of claim 15 in which two effector molecules are attached to the hinge region of the fragment.

17. (currently amended) ~~An~~ The antibody Fab' fragment according to claims 1-16 of claim 1 wherein the fragment is a Fab' fragment in which all the each effector molecules molecule attached to the fragment are is attached to the hinge region of the fragment.

18. (currently amended) ~~An~~ The antibody Fab' fragment according to claims 1-17 of claim 1 in which the fragment is a Fab' fragment in which each effector molecule attached to the fragment is attached to a cysteine in the hinge region of the fragment.

19. (currently amended) A method of producing an antibody Fab or Fab' fragment according to claims 1-18 to which at least one effector molecule is attached comprising:

- a. treating an antibody Fab or Fab' fragment in which both the interchain cysteine of C_L and the interchain cysteine of C_{H1} have been replaced with another amino acid with a reducing agent capable of generating at least one free thiol group in the fragment; and
- b. reacting the treated fragment with an effector molecule.

20. (currently amended) The method according to of claim 19 in which wherein the reductant reducing agent is a non-thiol based reductant reducing agent.

21. (currently amended) The method according to of claim 20 in which wherein the reductant reducing agent is a trialkylphosphine.

22. (currently amended) The method according to of claim 21 in which wherein the trialkylphosphine reductant reducing agent is tris(2-carboxyethyl)phosphine (TCEP).

23. (currently amended) The method according to of claim 22 claim 21 in which wherein the trialkylphosphine reductant reducing agent is tris(3-hydroxypropyl)phosphine (THP).

24. (currently amended) The method according to of claim 23 claim 19 in which wherein either or both of steps (a) and (b) are performed in the presence of a chelating agent.

25. (currently amended) The method ~~according to of~~ claim 24 ~~in which wherein~~ the chelating agent is EDTA.

26. (currently amended) The method ~~according to of~~ claim 25 ~~in which wherein~~ both steps (a) and (b) are performed in the presence of EDTA.

27. (currently amended) A composition comprising a mixture ~~containing of~~ two or more antibody Fab or Fab' fragments, ~~characterized in that~~ wherein the mixture is enriched for Fab or Fab' fragments in which the light chain chains in said fragments ~~is are~~ not covalently bonded to the heavy chain chains, both the interchain cysteines of C_L and C_{H1} have been replaced by another amino acid, and at least one effector molecule is attached to the ~~fragment~~ fragments.

28. (currently amended) A The mixture composition according to of claim 27 ~~in which wherein~~ greater than 50% of the mixture comprises a Fab or Fab' fragment fragments in which the light chain chains in said fragment fragments ~~is are~~ not covalently bonded to the heavy chain chains, both the interchain cysteines of C_L and C_{H1} have been replaced by another amino acid, and at least one effector molecule is attached to the fragment fragments.

29. (currently amended) The antibody fragment of ~~claims 1-28~~ claim 1 wherein the effector molecule is PEG.

30. (currently amended) A pharmaceutical composition comprising an antibody fragment ~~according to any of the preceding claims of~~ claim 1, together with one or more pharmaceutically acceptable excipients, diluents, or carriers.